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ORIGINAL PAPER

TYPES OF RESPONSES OF THE EU LABOUR MARKETS IN THE EARLY COVID-PANDEMIC PERIOD

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K e y w o r d s: labour market, COVID-19 pandemic, unemployment, employment, types of responses.

A b s t r a c t

The dual impact of the COVID-19 pandemic (simultaneous demand and supply shocks) was manifested by values of the economically important indicators, including measures applied to the labour market. The magnitude and scope of the response on the European Union labour markets were significantly country-specific parameters. The purpose of this article is to identify the types of responses of the EU labour markets in the early phase of the COVID-19 pandemic. One of the agglomeration clustering methods, namely the Ward approach, has been applied to create groups of the studied labour markets. The application of this method led to the identification of 4 clusters of economies, characterized by different types of response in terms of the direction and intensity of changes on the labour market during the COVID-19 pandemic.

TYPY REAKCJI UNIJNYCH RYNKÓW PRACY W POCZĄTKOWYM OKRESIE PANDEMII COVID-19

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Abstrakt

Dwutorowe oddziaływanie pandemii COVID-19 (jednoczesny szok popytowy i podażowy) znalazło swoje odzwierciedlenie w kształtowaniu się istotnych dla gospodarki wskaźników, w tym mierników rynku pracy. Siła oraz zakres reakcji unijnych rynków pracy były jednakże istotnie zindywidualizowane. Celem artykułu jest identyfikacja typów reakcji unijnych rynków pracy w początkowym okresie pandemii COVID-19. Do grupowania gospodarek pod względem zmian warunków na rynku pracy wykorzystano jedną z aglomeracyjnych metod grupowania, tj. metodę Warda. Zastosowanie tej metody pozwoliło na identyfikację czterech grup gospodarek cechujących się odmiennymi typami reakcji pod względem kierunku i intensywności zmian sytuacji na rynku pracy podczas pandemii COVID-19.

Introduction

Nowadays, the labour market is exposed to constant changes, and finding a proper way to follow such changes is a true challenge. New trends associated with automation, cutting-edge technologies or the use of artificial intelligence seem to have a direct influence on the shape and functioning of labour markets on an everyday basis. They determine the number of work places, evolution of jobs, development of new competences or the way people work. Sometimes, however, economies are forced to deal with events that are hardly predictable and unlikely to happen (Taleb, 2007, p. 10; Mączyńska, 2020, p. 1), and which cause negative consequences and disrupt the proper functioning of labour markets. An example of a rapid external shock to the whole world was the outbreak of the COVID-19 pandemic (McKibbin & Fernando, 2020, p. 45), the main consequence of which was the slowdown of economic activity. It evoked the simultaneous occurrence of shocks in the demand, supply and financial spheres of economy (Sieroń, 2020, p. 1, 2; Rio-Chanona *et al.*, 2020, p. 95, 96; Wang & Enilov, 2020, p. 6, 7). Through many channels, the pandemic hit individual economies (Vogt-Hajder & Górny, 2020, p. 197; Szczepański, 2020, p. 8). It either slowed down or completely halted production and consumption, broke supply chains, and disrupted trade flows. It effectively shook many markets, including the crude oil market, and troubled stock markets. It undermined the solvency of some companies and even countries (Nelson & Weiss, 2020, p. 1). The pandemic led to higher unemployment and professional inertia, which in turn caused instant and permanent changes on labour market, decelerated some ongoing trends and induced new ones.

The consequences of restrictions imposed by governments in order to counteract the spread of the pandemic (Galbadage *et al.*, 2020, p. 1; Açikgöz & Günay, 2020, p. 521) affected both employers and employees. Employers fought an uneven struggle to maintain businesses, which oftentimes were their only source of income and life achievement. Operating during the pandemic forced entrepreneurs to take firm steps, such as to reduce working hours, wages or jobs, or even to discontinue economic activity (Wawrzonek, 2020, p. 129; Botha *et al.*,

2021, p. 663; Grondys *et al.*, 2021, p. 1). This in turn had an impact on the socio-economic situation of employees (Kalinowski & Wyduba, 2020, p. 37), as the number of vacancies diminished and the unemployment rate rose. In the crises that had happened previously, such changes were gradual and stretched over longer periods of time, whereas the pandemic crisis led to an instant loss of jobs. Overnight, the global economy lost millions of work places.

Because of a different epidemiological situation in every country, the limitations and sanitary restrictions, and the nature of links with the global economy or the degree to which the domestic economy depends on the global economic cycle, the COVID-19 pandemic struck each of the European Union's economies differently, and affected variously their ability to take advantage of the available labour resources.

The aim of this study has been to identify the types of responses of the EU labour markets in the early period of the COVID-19 pandemic. In order to evaluate the situation of the Polish labour market compared to the other EU countries, an analysis of key indicators describing this market was made. The following were analysed: unemployment rate, employment rate and economic activity rate. The next step was to group the EU economies in terms of the direction and intensity of changes on the labour market caused by the pandemic.

The study included an analysis and assessment of changes in values of the indicators describing the labour market. To this aim, secondary data obtained from statistics provided by Statistics Poland (GUS) and Eurostat were scrutinised. The period of the empirical analyses basically covered the data contained in annual reports from years 2017-2021. One of the agglomeration clustering methods, namely the Ward method (Ward, 1963), was employed for the sake of grouping the EU economies. The application of this method enabled identification of countries which were similar in terms of the direction and intensity of changes on their labour markets during the early COVID-19 pandemic.

Relative Situation of the Polish Labour Market Compared to Other EU Countries

The COVID-19 pandemic caused a series of changes in the functioning of economies across the world. One of the most destabilising consequences of the epidemic was recession, which struck most countries. The worsening economic conditions were immediately reflected in the changes on the labour market. The conditions underlying this market were altered rapidly. Same as the depth of the recession, the response of labour markets measured with such indicators as the unemployment rate or employment rate varied from country to country. The range and rate of the response were highly country-specific parameters, and

depended mainly on the existing conditions of a country's labour market, the incidence of infections with the coronavirus, the extent of sanitary restrictions as well as the depth and duration of the recession itself. The epidemic situation and the restrictions imposed to counteract it caused a rise in unemployment and economic inactivity, in addition to which there were certain modifications in the way work was done in many professions.

In the period before the pandemic, the indicators characterising the situation on the labour market in the EU countries had been improving year after year. The data published by Eurostat show that Poland in 2019, with its rate of unemployment equal 3.3%, belonged to the group of countries with the lowest unemployment rates (Tab. 1). At that time, the highest percentage of unemployed persons in the working age population was noted in Greece (17.9%), Spain (13.8%) and Italy (9.8%). In the eurozone, the unemployment rate reached 7.5%, but did not exceed 7% in the whole EU.

Demand and supply shocks caused by the pandemic forced certain adjustments on the labour markets, and employers began to fight an unequal struggle to survive and maintain the employment rate. Although most countries offered solutions to protect work places, the state support was limited. Sooner or later, employers who needed to seek savings were forced to take drastic measures, especially to reduce employment. Production stoppages caused by restrictions, discontinuation of business activity, reduction of work places all led to a rise in unemployment in most EU economies.

According to the Eurostat data, the unemployment rate in the EU in 2020 rose to 7.1%, i.e. by 0.4 percentage point relative to the year preceding the outbreak of the pandemic. The highest increase in the unemployment rate was observed in Estonia, Lithuania, Latvia and Sweden, where it ranged from 1.6 to 2.4 percentage points. In the same time period, despite the difficult situation on labour markets, unemployment measured in annual terms decreased in Italy, France, Greece and in Poland.

Moreover, it should be emphasised that while the GDP in the EU in year 2020 fell by 6% in a year (Eurostat data), unemployment increased simultaneously by just 0.4 pp. This substantiates the claim that a decrease in economic activity in the EU countries was reflected in the conditions underlying labour markets only slightly and basically rather briefly, an effect that can be attributed to the targeted actions and well-thought policies developed in the EU.

Despite fears, the impact of the recession on conditions governing the labour market was lesser than expected. In particular, the risk of workforce reduction was mitigated by short- and long-term aid schemes dedicated to companies operating in the industries most severely affected by regulations. In addition, as the knowledge of health consequences of COVID-19 and availability of vaccines improved, governments of many countries decided to loosen some restrictions and limit the economic activity to a lesser extent. Moreover, alongside the economic

Table 1

Unemployment rate* according to BAEL in the European countries (in %)

Countries	2017	2018	2019	2020	2021	2022	Δ 2019-2020 [pp]	Δ 2020-2021 [pp]
Estonia	5.7	5.2	4.4	6.8	6.1	5.5	2.4	-0.7
Lithuania	7.2	6.3	6.4	8.7	7.3	6.1	2.3	-1.4
Latvia	8.8	7.6	6.4	8.3	7.7	6.9	1.9	-0.6
Sweden	6.2	5.8	6.1	7.7	7.8	6.3	1.6	0.1
Spain	16.9	14.9	13.8	15.2	14.5	12.6	1.4	-0.7
Luxembourg	5.3	5.3	5.3	6.5	4.8	4.1	1.2	-1.7
Austria	5.7	5.0	4.7	5.9	6.0	4.5	1.2	0.1
Romania	5.8	4.9	4.5	5.7	5.3	5.2	1.2	-0.4
Finland	8.1	6.9	6.1	7.1	7.1	6.3	1.0	0.0
Ireland	6.4	5.4	4.6	5.5	5.8	4.2	0.9	0.3
Slovakia	7.9	6.3	5.6	6.5	6.7	6.0	0.9	0.2
Bulgaria	7.1	6.2	5.3	6.1	5.2	4.2	0.8	-0.9
Hungary	3.9	3.5	3.2	4.0	3.9	3.5	0.8	-0.1
Malta	3.6	3.3	3.3	4.1	3.2	2.7	0.8	-0.9
Germany	3.5	3.1	2.9	3.6	3.5	2.9	0.7	-0.1
Croatia	10.8	8.2	6.4	7.0	7.2	6.7	0.6	0.2
Cyprus	11.1	8.4	7.0	7.6	7.4	6.7	0.6	-0.2
Slovenia	6.6	5.2	4.4	5.0	4.6	3.9	0.6	-0.4
Czechia	2.8	2.2	2.0	2.5	2.8	2.2	0.5	0.3
Denmark	5.3	4.8	4.7	5.2	4.7	4.1	0.5	-0.5
Portugal	9.0	7.0	6.5	6.9	6.5	5.9	0.4	-0.4
Netherlands	5.2	4.3	3.9	4.2	3.5	2.9	0.3	-0.7
Belgium	7.1	5.9	5.3	5.6	6.0	5.3	0.3	0.4
Poland	4.9	3.9	3.3	3.2	3.4	2.8	-0.1	0.2
Greece	21.8	19.7	17.9	17.7	14.7	12.3	-0.2	-3.0
France	9.0	8.7	8.1	7.6	7.5	6.9	-0.5	-0.1
Italy	11.1	10.4	9.8	9.3	9.4	8.0	-0.5	0.1
EU27	8.1	7.2	6.7	7.1	6.8	5.9	0.4	-0.3
Euro area (19)	8.9	8.1	7.5	7.8	7.6	6.5	0.3	-0.2

*among persons aged 20 to 64 years
Source: developed by the author, based on the Eurostat data.

recovery in the second quarter of 2021 (Eurostat data), the market mechanisms were activated. The economic growth led to the creation of new work places, easing the situation on the labour market in the subsequent months in 2021, hence the number of unemployed workers began to decrease (Tab. 2). The market quickly recovered from the crisis caused by the pandemic and lockdowns.

Table 2

Number of unemployed persons* in the EU countries (in thousands of persons)

Countries	2017	2018	2019	2020	2021	2022	2019-2020 [%]	2020-2021 [%]
Estonia	37	34	29	44	40	36	51.7	-9.1
Lithuania	101	88	89	123	103	87	38.2	-16.3
Malta	8	8	8	11	8	8	37.5	-27.3
Latvia	83	71	59	76	68	62	28.8	-10.5
Sweden	307	291	309	391	399	325	26.5	2.0
Romania	465	395	364	460	424	426	26.4	-7.8
Hungary	183	163	149	188	183	166	26.2	-2.7
Czechia	148	115	104	131	143	114	26.0	9.2
Austria	246	217	202	253	261	200	25.2	3.2
Luxembourg	15	15	16	20	15	13	25.0	-25.0
Germany	1,400	1,268	1,183	1,423	1,426	1,217	20.3	0.2
Slovakia	219	175	154	179	182	162	16.2	1.7
Ireland	141	120	105	122	135	102	16.2	10.7
Finland	204	175	155	180	182	165	16.1	1.1
Bulgaria	233	200	172	195	164	134	13.4	-15.9
Slovenia	65	51	44	49	46	38	11.4	-6.1
Denmark	144	130	130	144	130	115	10.8	-9.7
Cyprus	46	35	30	33	33	31	10.0	0.0
Croatia	191	143	111	122	128	119	9.9	4.9
Spain	3,768	3,338	3,111	3,391	3,283	2,872	9.0	-3.2
Netherlands	433	358	327	355	303	257	8.6	-14.6
Portugal	436	342	318	334	321	294	5.0	-3.9
Belgium	345	291	264	276	303	272	4.5	9.8
Poland	814	636	536	519	561	475	-3.2	8.1
France	2,594	2,504	2,331	2,187	2,180	2,027	-6.2	-0.3
Greece	1,015	910	826	772	657	565	-6.5	-14.9
Italy	2,757	2,592	2,429	2,206	2,258	1,931	-9.2	2.4
EU27	16,398	14,668	13,554	14,185	13,938	12,214	4.7	-1.7
Euro area (19)	13,913	12,595	11,680	12,035	11,806	10,340	3.0	-1.9

*among people aged 20 to 64 years
Source: developed by the author, based on the Eurostat data.

With the outbreak of the pandemic, most EU countries, including Poland, experienced the slowdown of the then beneficial decreasing trend in the number of unemployed persons, which naturally translated into a low unemployment rate. The biggest challenge that European labour markets have faced in recent years is to improve the work supply, especially in the face of the ageing of working age

populations in Europe. The pandemic and the resulting restrictions on economic activity led to a rise in the absolute number of unemployed persons aged 20-64 (Tab. 2). The Eurostat estimates that the rise of unemployment in this age category due to the economic slowdown was the highest in Estonia, Lithuania, Latvia and Malta. There, it exceeded the level of 25% relative to the previous year. Although the Estonian government launched aid programmes for the amount equal 3% of the national GDP during the first wave of the pandemic, the country experienced a distinct decrease in employment and a rise in unemployment (Kutsar & Kurvet-Käosaar, 2021, p. 1, 2). The absolute number of unemployed persons increased by 50% in the course of one year. Actually, it was only in Italy, Greece, France and Poland that the population of unemployed persons decreased by 9.2%, 6.5%, 6.2% and 3.2%, respectively, in comparison with year 2019. Meanwhile, the average number of the unemployed in the whole EU increased by 4.7%. The loss of work places was most evident in the sectors that were struck the worst by the pandemic, i.e. submitted to most severe restrictions, such as hospitality, catering, tourism, as well as a wide range of services and industries (Forsythe *et al*., 2020, p. 7; Mouloudj *et al*., 2020, p. 159; Stojczew, 2021, p. 161). The situation on the labour market began to stabilise slowly as the incidence of infections started to decline, the restrictions were loosened, and the economy began to revive in the subsequent quarters of year 2021.

It is estimated that the crisis caused by the COVID-19 pandemic hit more badly the economic activity of workers than the unemployment itself. One of the indicators that can describe the response of the labour market to a serious economic shock is a change in the economic activity rate, which shows the share of persons economically active in a given population. As the situation on the market was worsening and problems finding work were becoming more and more persistent, potential employees, especially young ones, could be pushed out of the market and become economically inactive. As a result of the pandemic crisis, economic inactivity rates rose faster than unemployment rates in many countries.

In turn, the extent to which the human factor is engaged in the work process is illustrated by the economic activity rate (Tab. 3).

In 2019, the highest percentage of professionally active persons among all working age persons was observed in Sweden, Estonia, the Netherlands and Lithuania. In these countries, the mentioned indicator exceeded 83%, while the EU average was 77.9%. In comparison, the percentage of professionally active persons in Poland was among the lowest in Europe, as it equalled 74.7%. In contrast, the highest economic activity rate was noted in Croatia, Romania, Italy, Spain and Greece.

Changes in populations active on the labour market evoked by the pandemic restrictions contributed to the lowering of the economic activity rate in the EU by 0.8 pp. The percentage of economically active people in the age group from 20 to 64 years decreased the most in Greece (–3.2 pp), in Italy (–2.3 pp), Ireland

Table 3

Economic activity rate* in the EU countries (in %)

Countries	2017	2018	2019	2020	2021	2022	Δ 2019-2020 [pp]	Δ 2020-2021 [pp]
Latvia	81.9	83.0	82.6	83.8	81.6	82.7	1.2	-2.2
Malta	75.8	78.1	79.4	80.6	81.7	83.4	1.2	1.1
Romania	66.6	67.2	68.2	69.1	70.8	72.3	0.9	1.7
Estonia	84.0	84.1	84.2	84.9	84.5	86.6	0.7	-0.4
Croatia	71.2	71.0	71.3	71.9	73.5	74.7	0.6	1.6
Hungary	78.5	79.5	80.1	80.7	82.0	83.1	0.6	1.3
Lithuania	81.9	83.1	83.5	84.0	83.5	84.1	0.5	-0.5
Luxembourg	75.5	76.1	76.8	77.1	77.9	78.0	0.3	0.8
Poland	73.6	74.2	74.7	75.0	78.0	78.9	0.3	3.0
Netherlands	83.2	83.6	84.2	84.3	84.6	85.4	0.1	0.3
Finland	79.7	80.9	81.2	81.3	82.7	83.7	0.1	1.4
Sweden	86.6	86.8	86.8	86.8	87.5	87.7	0.0	0.7
Czechia	80.8	81.7	81.9	81.8	82.2	83.2	-0.1	0.4
Denmark	80.9	81.3	82.2	82.1	82.9	83.5	-0.1	0.8
Slovakia	79.5	79.6	80.0	79.8	80.0	81.6	-0.2	0.2
Cyprus	79.6	80.6	81.4	81.1	82.0	83.5	-0.3	0.9
Slovenia	78.0	78.9	79.3	78.7	79.8	81.1	-0.6	1.1
France	78.4	78.8	78.7	78.1	79.2	79.5	-0.6	1.1
Belgium	73.7	74.1	74.5	73.8	75.1	76.0	-0.7	1.3
Germany	81.0	81.4	82.0	81.1	82.5	83.5	-0.9	1.4
Bulgaria	76.1	76.4	78.4	77.4	77.2	79.0	-1.0	-0.2
Austria	80.0	80.2	80.5	79.5	80.4	80.9	-1.0	0.9
Portugal	79.6	80.3	80.7	79.7	81.2	82.4	-1.0	1.5
Spain	78.9	78.8	78.9	77.5	79.2	79.5	-1.4	1.7
Ireland	77.9	78.2	78.6	76.3	79.5	81.6	-2.3	3.2
Italy	70.0	70.3	70.5	68.2	69.3	70.4	-2.3	1.1
Greece	73.4	73.5	74.0	70.8	73.4	75.6	-3.2	2.6
EU27	77.1	77.5	77.9	77.1	78.5	79.4	-0.8	1.4
Euro area (19)	77.7	78.1	78.3	77.2	78.5	79.4	-1.1	1.3

*among people aged 20 to 64 years
Source: developed by the author, based on the Eurostat data.

(–2.3 pp) and Spain (–1.4 pp). A relatively high reduction in economic activity was also observed in Portugal, Austria, Bulgaria and Germany. In turn, the decrease in this parameter in the other countries was either small or non-existent.

The situation caused by the pandemic also resulted in changes in the percentage of working persons in the group of people aged 20 to 64 years (Tab. 4).

Table 4

Employment rate* in the EU countries (in %)

Countries	2017	2018	2019	2020	2021	2022	Δ 2019-2020 [pp]	Δ 2020-2021 [pp]
Malta	73.0	75.5	76.8	77.3	79.1	81.1	0.5	1.8
Poland	70.0	71.4	72.3	72.7	75.4	76.7	0.4	2.7
Croatia	63.6	65.2	66.7	66.9	68.2	69.7	0.2	1.3
Romania	62.7	63.9	65.1	65.2	67.1	68.5	0.1	1.9
Hungary	75.4	76.7	77.6	77.5	78.8	80.2	-0.1	1.3
France	71.3	72.0	72.3	72.1	73.2	74.0	-0.2	1.1
Netherlands	78.9	80.0	81.0	80.8	81.7	82.9	-0.2	0.9
Latvia	74.6	76.8	77.3	76.9	75.3	77.0	-0.4	-1.6
Denmark	76.6	77.5	78.3	77.8	79.1	80.1	-0.5	1.3
Czechia	78.5	79.9	80.3	79.7	80	81.3	-0.6	0.3
Luxembourg	71.5	72.1	72.8	72.1	74.1	74.8	-0.7	2,0
Finland	73.2	75.3	76.2	75.5	76.8	78.4	-0.7	1.3
Belgium	68.5	69.7	70.5	69.7	70.6	71.9	-0.8	0.9
Cyprus	70.8	73.9	75.7	74.9	75.9	77.9	-0.8	1.0
Slovakia	73.2	74.5	75.6	74.6	74.6	76.7	-1.0	0.0
Slovenia	72.9	74.9	75.9	74.8	76.1	77.9	-1.1	1.3
Portugal	72.5	74.7	75.5	74.2	75.9	77.5	-1.3	1.7
Germany	78.2	78.9	79.6	78.2	79.6	81.0	-1.4	1.4
Estonia	79.2	79.7	80.5	79.1	79.3	81.9	-1.4	0.2
Sweden	81.2	81.8	81.5	80.1	80.7	82.2	-1.4	0.6
Lithuania	76.0	77.8	78.2	76.7	77.4	79.0	-1.5	0.7
Bulgaria	70.6	71.7	74.3	72.7	73.2	75.7	-1.6	0.5
Italy	62.3	63	63.5	61.9	62.7	64.8	-1.6	0.8
Austria	75.4	76.2	76.8	74.8	75.6	77.3	-2.0	0.8
Spain	65.5	67.0	68.0	65.7	67.7	69.5	-2.3	2.0
Greece	57.4	59.0	60.8	58.3	62.6	66.3	-2.5	4.3
Ireland	72.9	74.0	75.0	72.1	74.9	78.2	-2.9	2.8
EU27	70.9	71.9	72.7	71.7	73.1	74.7	-1.0	1.4
Euro area (19)	70.8	71.8	72.5	71.2	72.5	74.2	-1.3	1.3

*among people aged 20 to 64 years
Source: developed by the author, based on the Eurostat data.

The rising employment rates in the years before the pandemic were evidence of an improving labour market situation in the EU. In 2019, the said rate was the highest in Sweden, Germany, the Netherlands, Estonia and in the Czech Republic. In these countries, the percentage of employed persons in the 20-64--year age backets reached nearly 80%. In Poland, this percentage was 72.3%

and was only slightly lower than the EU average (72.7%). On the other hand, the lowest percentage, between 60 and 68%, was recorded in Greece, Spain, Italy and Romania.

The mass-scale collapse and shrinking of national economies that took place at the onset of the second quarter of year 2020 affected the rates of employment in all EU member states except Malta, Poland, Croatia and Romania. The highest decrease appeared on the labour markets in Ireland, Greece, Spain, Austria, Italy and Bulgaria, where it ranged from 1.6 to 2.9 pp. The more profound response in the countries of Southern Europe might have been correlated with the more severely reduced economic activity due to the economies of these countries being considerably dependent on the broadly understood tourism industry. The economic slowdown observed in Greece, Spain or Italy in the first half of year 2020 was the most severe in the EU. The more than average decrease in the GDP was also noted in Austria (Nazarczuk *et al*., 2022, p. 45, 46). In turn, although Ireland did not experience a collapse of its economy, as manifested by annual data (an increase by 6.2%), it completely froze its economy for several weeks, which induced an instant decrease in employment. In April 2020, the unemployment rate in Ireland reached 22.4% whereas in February that year it was just 4.9% (Eurostat data).

Identification of Types of Responses of the EU Labour Markets to the COVID-19 Pandemic

Because the EU countries followed different paths while dealing with changes in the situation on their labour markets, a complex analysis of the responses of their economies to the COVID-19 pandemic is difficult. In order to identify any regularities in the countries' responses on the labour market, it was decided to apply an agglomeration method, namely the Ward method, which served to identify clusters of countries following a similar pathway of changes. To this end, changes in four economic indicators, such as the unemployment rate, number of the unemployed, employment rate and the rate of economic activity, in years 2019-2020 were analysed. Also, a decision was made not to stimulate the variables (unification of the direction of variables) so as to maintain greater differences between the responses of particular countries.

The applied Ward method intends to minimise variance within a given group (in this case, countries) while simultaneously maximising differences between clusters. Technically, this is achieved by including objects to a group in such a way as to minimise the sum of squares of deviations of all objects in the existing groups from the centre of gravity of a new group (Ward, 1963). This procedure is known for its efficiency in creating homogenous clusters (Nazarczuk & Umiński, 2019, p. 42; Cicha-Nazarczuk, 2021, p. 171). In this

study, the Euclidean distance was used as a measure of dissimilarity, and its higher values indicate greater variance between the countries in the direction and structure of the analysed indicators.

The dendrogram plotted in Figure 1 allows the identification of clusters of countries in which the observed changes are similar. Longer horizonal lines illustrate greater distance between individual countries and clusters of countries, simultaneously indicating greater Euclidean distance (measure of dissimilarity). Because of the adopted agglomeration approach to the clustering of countries, a variety of possible forms of the assignment of countries to clusters emerged, depending on the assumed value of the cutting point. Hence, the left-hand side of the diagram shows individual countries which step by step are linked into clusters up to a single cluster (on the right-hand side of the diagram).

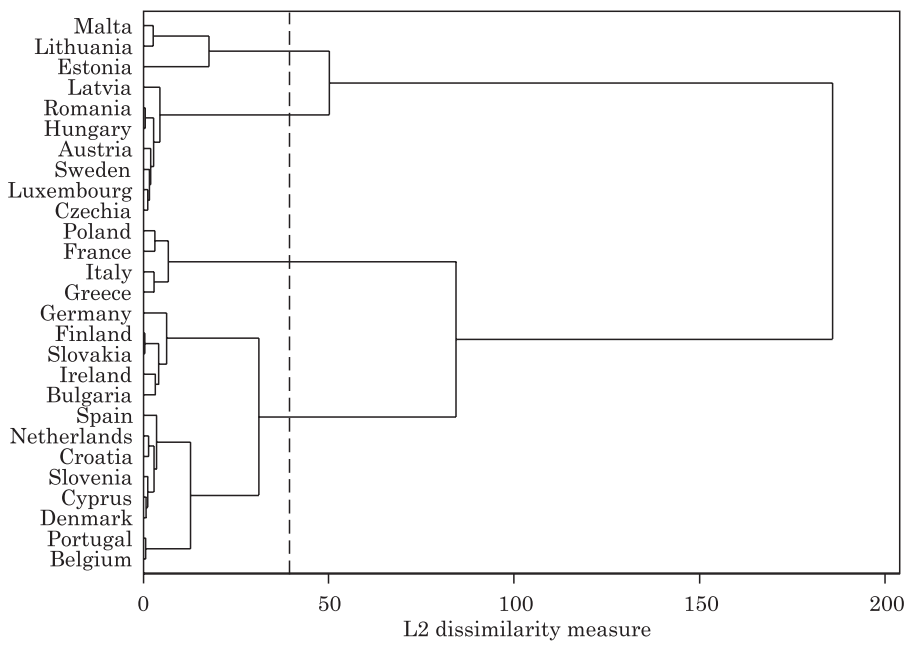

Fig. 1. Dendrogram illustrating results of clustering with the Ward procedure; the dashed line shows the chosen solution

Source: developed by the author.

An analysis of the data displayed as explained above provides a complete picture of possible solutions, including different clustering patterns, depending on the number of clusters or degree of similarity expected by the researcher. In our case, the value of the dissimilarity measure was assumed to be 40 (based on the Duda and Hart criterion), which allowed to distinguish four clusters characterised by high similarity (within each cluster) in the scope of changes on the labour market.

Data on the relative position of clusters of countries with respect to changes in the situation on their labour markets were collated in Table 5. A detailed analysis of these data allowed to identify the types of responses of the EU labour markets during the COVID-19 pandemic.

Table 5

Average changes in the selected indicators on the labour market in the groups of EU countries in 2019-2020

Countries	Cluster 1	Cluster 2	Cluster 3	Cluster 4
	Poland, France, Greece, Italy	Croatia, Spain, Cyprus, Netherlands, Slovenia, Denmark, Belgium, Portugal, Germany, Bulgaria, Ireland, Finland, Slovakia	Romania, Austria, Latvia, Czechia, Sweden, Luxembourg, Hungary	Lithuania, Estonia, Malta
Δ unemployment rate	-0.32	0.69	1.20	1.83
Δ number of unemployed	-6.27	11.65	26.30	42.48
Δ employment rate	-0.97	-1.11	-0.73	-0.80
Δ economic activity rate	-1.45	-0.59	0.27	0.80

Explanation: the table presents average values of the selected indicators, according to the identified clusters of countries
Source: developed by the author.

Cluster 1, which includes Poland, France, Greece and Italy, was distinguished by a relatively most beneficial change on the labour market per year. This was a consequence of an average decrease in the unemployment rate and number of unemployed persons while the employment rate and economic activity rate decreased only slightly. The response of this group of economies to changes in the way they had to function during the pandemic consisted mainly of reduced economic activity and a small decrease in the level of employment.

The biggest group of economies fell into cluster 2. In this case, the response of labour markets to the reduced economic activity and the distinct slowdown in the economic growth rate during the COVID-19 pandemic were manifested by a relatively small increase in the number of unemployed persons and a percentage of the unemployed in the population of economically active people. In those countries, a relatively high decrease in the employment rate as well as a moderate reduction in economic activity were observed.

Clusters 3 and 4 were distinguished by a similar direction of changes pertaining to the situation on the labour market. However, they differed in the magnitude of this phenomenon. Changes in the economic situation in both clusters followed changes on the labour market. They were characterised by a distinct increase in both the unemployment rate and the number of unemployed workers as well as a reduced level of employment. In economies of the countries within

the two clusters, there was also a small increase in labour professional activity, although it surpassed 1 pp only in Latvia and Malta.

The extent of the negative changes in the indicators showing the use of labour resources in particular economies was greater in cluster 4. The relatively most difficult situation on the labour market developed in Lithuania, Estonia and Malta. Smaller economies tend to be more sensitive to changes in the economic situation. The crisis caused by the pandemic had a significant influence on the Estonian and Lithuanian labour markets, leading to the highest unemployment rates these countries had experienced for years. Although both countries were struck by recession to the least degree compared to all EU economies, the unemployment rate in 2020 rose there by around 2.3-2.4 pp (Tab. 1), and the number of unemployed persons increased over a year by 51% and 38%, respectively (Tab. 2). On the other hand, the labour market in Malta is relatively small and heavily dependent on tourism. Hence, the period of reduced economic activity due to restrictions and limited travel could have contributed to stagnation in the tourism industry and a rise in the number of unemployed workers in the country's economy.

It is worth underlining that the changes on the labour market observed in 2020 could have been induced by several factors, from the first wave of the coronavirus infections to the different intensity of COVID-19 infection rates in different countries, which prompted their governments to launch public interventions of varying degrees and structure of targets. Travel restrictions, sanitary restrictions and limitation of economic activity (lockdowns) were imposed, all for the sake of preventing the rapid spread of the virus. Administrative restrictions of business activity, together with quarantines and adaptation measures taken by businesses, had more negative consequences than the 2008 global economic crisis (Radlińska, 2020). The suspension of production, partial or complete closure of companies, etc. led to negative changes on the labour market by shortening the working time of some of the workers, increasing the number of unemployed people wherever it was impossible to make changes in the organisation of work otherwise or if the financial standing of enterprises deteriorated.

The responsibility for counteracting the effects of the pandemic rested mostly on governments of particular countries. In order to constrain the extent of adverse changes in economy and on the labour market, states launched aid programmes of various scale and scope (the so-called anti-crisis shields). These involved, for example, financial support measures addressed to companies to compensate for lost revenues, tax-free subsidies to cover fixed costs, reductions of corporate income taxes, temporary suspension of payments of social security contributions, grants to companies, government guarantees for loans, as well as the co-financing from public funds of workers who had their working hours reduced and their benefits suspended (Bolesta & Sobik, 2020).

According to the analysis of the Polish Economic Institute (Dębkowska *et al*., 2021), the effectiveness of public funds used by EU countries varied under the so-called anti-crisis shields in the context of maintaining employment, preventing professional deactivation, maintaining financial liquidity (and preventing bankruptcy) in the enterprise sector. The cost-effectiveness profiles of the so-called anti-crisis shields in the EU-27 countries are displayed in Table 6.

Table 6

Profiles of the EU countries in terms of effectiveness of expenditures within anti-crisis packages

Effective support to employees only	Ineffective support to employees only
Belgium, France, Greece, Romania, Sweden	Austria, Bulgaria, Croatia, Cyprus, Czechia, Germany, Ireland, Lithuania, Luxembourg, the Netherlands, Spain
Effective support to both employees and employers	Ineffective support to both employees and employers
Denmark, Italy, Finland, Poland	Estonia, Hungary, Latvia, Malta, Portugal, Slovakia, Slovenia

Explanation: names of countries within each box of the table are given in alphabetic order
Source: developed by the author based on Dębkowska *et al*. (2021, p. 49).

The results of our analysis prove that it was only in Poland, Denmark, Italy and France that the costly means of support in the form of public funds allocated to 'the struggle with the pandemic' were relatively effective in suppressing the wave of bankruptcies of companies and maintaining the employment level in national economies. In the said group of countries, Poland expended the highest sums relative to its GDP. Hence, the scope of public intervention in this case was the greatest. In turn, considering all EU economies, the expenses of this type relative to the GDP were the highest in Latvia.

In Estonia, Hungary, Latvia, Malta, Portugal, Slovakia and Slovenia, the effectiveness of the implemented public support schemes raised significant doubts among the researchers from the Polish Economics Institute. Actions taken by these countries were not effective either in reducing unemployment and economic inactivity, or in preventing a wave of business failures.

The remaining EU-27 economies were characterised by more evident allocation of funds towards the measures aiming to maintain the financial stability of enterprises, as it was observed in Austria, Bulgaria, Croatia, Cyprus, the Czech Republic, Germany, Ireland, Lithuania, Luxembourg, the Netherlands, and Spain, or to prevent mass layoffs by keeping workers on the labour market, which was the direction noted in Belgium, France, Greece, Romania and Sweden.

Summary

The situation on the labour markets of the EU member states in the early period of the COVID-19 pandemic reflected the changes observed in the economies, the subsequent waves of the pandemic and the regulations imposed by the governments. Despite the expansive fiscal policy and public expenditure associated, i.a. with attempts to prevent mass layoffs and to protect work places, the economies were unable to avoid decreased employment, increased economic inactivity and interference in labour relations.

The extent of the changes in the labour market varied across the EU countries due to the different measures taken by the countries to counteract the negative effects of the closures, their different economic positions and labour market situations, as well as the capacity of a given economy to absorb the negative effects of changes such as major demand or supply shocks (which depends, among other things, on the structure of economic sectors or the openness of a country's economy), the objectives and success of the measures implemented.

Above all, the countries differed in their approach to the ways in which the economic consequences of the pandemic concerning employment could be counteracted or alleviated. Some governments focused on implementing solutions which served to protect work places, ensuring a less rapid increase in the unemployment rate. Hence, changes on the labour market observed in Poland, Italy, France or Greece during the pandemic consisted mainly of limited economic activity while the employment level decreased only slightly. Expensive support measures composed of public expenditure dedicated to 'the fight with the pandemic' in these economies turned out to be effective in preventing mass redundancies by keeping employees on the labour market.

Other countries decided to mollify the consequences of unemployment and somewhat promote unemployment statistics by paying benefits to people who lost their jobs because of the economic turbulences. The economies of Malta, Estonia and Lithuania were in the relatively worst situation, which was manifested by a distinct increase in the unemployment rate and number of unemployed people as well as a reduced employment level. Moreover, in the group of these countries, the effectiveness of the implemented public support system raised considerable doubts among the researchers of the Polish Economic Institute, and the measures their governments took proved to be ineffective in reducing unemployment and preventing a wave of bankruptcies of enterprises.

Compared to many of the EU countries, the situation on the Polish labour market in terms of the changes in the use of workforce resources was relatively positive. This was a consequence of several factors. First of all, prior to the outbreak of the pandemic Poland had had one of the lowest unemployment rates in the European Union. Secondly, this period of time coincided with a rapid economic growth, which alongside the progressing ageing of the society, resulted in the shortage of workforce supply. In addition, the outbreak of the pandemic

meant that most foreign workers returned to their native countries, which helped to alleviate the negative events on the labour market. The public support in the form of anti-crisis and financial shields as well as the evident recovery of the economy in the second quarter to 2021 determined the short-term character of negative trends on the Polish labour market.

The identification of the different types of responses of the EU labour markets during the COVID-19 pandemic implicates the need to plan the activities properly adjusted to the needs, structure and conditions of the functioning of national labour markets, which would create a chance to minimize the negative impact of possible future economic shocks.

The analysis presented in this article has certain limitations. One is the limited time period covered by the analysis, that is the early period of the COVID-19 pandemic and its impact on economy and the EU labour markets. Meanwhile, effects of the shock caused by the coronavirus could be shifted in time, influence the economy at different rates or at a different scale, which may depend on the structure of a given economy, situation on the labour market, implementation of countercyclical programmes or the strength and scope of links between particular economies. In addition, this article only discusses the issue of the impact of anti-crisis programs on easing the situation on the labour market during the pandemic in individual EU countries. However, the indicated problem requires further research in this area.

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